



State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF HAZARDOUS WASTE MANAGEMENT
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MAR 05 1990

Richard E. Hahn, Esq.
M.A. Hanna Company
1301 East Ninth Street, Suite 3600
Cleveland, OH 44114-1824

Dear Mr. Hahn:

Re: L.E. Carpenter
Draft Remedial Investigation (RI) Findings Report,
Dated November 1989
Comments of EPA Region II and NJDEP

The New Jersey Department of Environmental Protection (Department) and the United States Environmental Protection Agency, Region II (EPAII) RI report have assembled all current comments. These comments cannot be considered "final," however, since the Department's quality assurance evaluation of the analytical data cannot be completed until previously omitted laboratory data are supplied.

The comments of both agencies are enclosed.

Should you have any questions concerning these comments, contact me at (609) 633-1455.

Very truly yours,

Edgar G. Kaup, P.E., Case Manager
Bureau of Federal Case Management

EGK:cn

Enclosures

c: W. Dunnell, Geo Engineering
J. Boyer, DHSM/BEERA
J. Josephs, USEPA II
B. Diepeveen, DWR/BGWPA



Comments on L.E. Carpenter Draft
Remedial Investigation Finding Report

Dated November 1989

General Technical Comments

1. Appendix A, Remedial Investigation Scope of Work, of the Amended Administrative Consent Order (1986) states that the level of soil, surface water and groundwater pollution must be compared to applicable standards and guidelines. NJDEP Soil Action Levels are reference numbers used to identify the presence of soil contamination. The RI Report must utilize these numbers as a comparison in all discussions of soil contamination at the site. Specific groundwater and surface water standards are indicated on Table I.
2. Total xylenes are a targeted volatile organic compound in the analytical methodology, EPA Method 8240, utilized in this investigation. The Summary tables supplied in the RI Report (and therefore the source of all discussions in the document) interchangeably lists total xylene as a targeted or a non-targeted compound. Since xylene is a major contaminant at the site, this error can dramatically alter the results, especially since cleanup criteria for volatiles are often based on the total targeted volatile organic levels. The Summary Tables must be revised to correct this inaccuracy and all appropriate figures must be adjusted appropriately.

Specific Comments .

3. Soil Gas Survey Results (XTEB), p. 22

According to the Findings, an area between Washington Forge Pond and North Main Street was investigated during the Petrex soil gas survey "to characterize background volatile organic conditions in the soil." Yet, plate 2 from the Petrex Report identifies this area as having high ion counts, indicating high contaminant concentrations of toluene, xylene, and ethyl benzene in the subsurface and/or groundwater. Unless proper justification is provided in the RI Report for excluding this area, further investigation will be required in the next phase.

4. Hand Auger Sample Results, p. 30

Analytical results of hand auger samples collected at the surface did not detect elevated volatile organic levels. Due to the potential for volatilization, these results are not unexpected and may not reflect the true contaminant levels in the near surface soils. All future volatile organic sampling must be collected from a subsurface interval (minimum depth of 18 ").

5. Rockaway River - Metals Results, p. 41

The lead level in surface water sample SW-3 should properly be reported in the units "ug/l", not "ppm" as written.

6. Northeast Corner Drainage Feature, p. 42

As noted in the previous comment, the units for surface water results should be "ug/l".

7. Assessment of Impact of Contaminants on Human Health, p. 49

The editorial supplied in the first paragraph of Section 6.0 must be removed. No determination of the contaminant impact on human health and the environment has been properly presented at this time.

The Assessment selects critical or target contaminants based on criteria established in the RI Report. One of those criteria is "contaminants that occurred in soil samples below six inches, particularly volatile organic compounds, were evaluated as potential groundwater contaminants instead of possible airborne contaminants." The Report fails to provide any scientific justification for this position. As noted in Comment #4 above, the potential loss of volatile constituents in hand augered surface samples may have inaccurately diminished the true level of VO contamination in the near surface soils. Discounting volatile organic levels from near surface or subsurface samples (3'-5') may incorrectly remove a potential exposure pathway from consideration. Without proper rationale, this criteria must be removed from consideration, and subsurface contaminant levels must be included in the Assessment.

Additional comments on the Assessment may be forthcoming following a review by the Environmental Toxicology and Risk Assessment Section/BEERA.

8. Identification of Potential Receptors, p. 51

Additional exposure pathways must be discussed in the Assessment, including:

- ingestion, inhalation and absorption of soil contaminants/volatile organics by residents, mainly children, who have unrestricted access to the site (no fencing around the site); and,
- inhalation and absorption of soil contaminants/volatile organics by workers at the site (the buildings are currently rented to Victrex).

9. Methylene Chloride, p. 61

The RI Report concludes that, although methylene chloride has been found in the drainage ditch sediment and surface water samples, "no impact is indicated on the Rockaway River." Since only one river sample was taken downgradient of the suspected source area (and none at or past the river's confluence with the drainage ditch), this conclusion is not supported by the sample results and must be removed. Similarly, the limited off-site groundwater sampling to date fails to uphold the conclusion that off-site migration of contamination is not indicated. Justify this conclusion (and similar conclusions for xylene, ethylbenzene and other groundwater contaminants) or remove it.

10. Conclusions - Shallow Groundwater, p. 62

The Groundwater Quality Contour Map for volatile organics suggests that volatile organic contamination is found off-site and moving away from the original sources, namely the tank farm and the former impoundment area. This contradicts the conclusion reached in the Assessment section of the RI Report. Clarify this discrepancy.

11. Recommendations for Additional Investigation, p. 68

In addition to the locations proposed for surface water and sediment samples in the Rockaway River, samples must also be collected immediately adjacent to the former impoundment area to investigate contaminant discharge to the river at this position.

Appendix A of the 1986 Amended ACO requires L.E. Carpenter to "collect, present and discuss all data necessary to adequately support the development of the feasibility study and the selection of a remedial action...". This statement presupposes that some preliminary screening of potential alternatives has been completed. As stated in a letter (E.G. Kaup to W. Dunnell) dated September 29, 1989, Geo Engineering was informed of the necessity to initiate a Development and Screening of Alternatives as part of the Feasibility Study. Any recommendations for additional investigations must be based, in part, on this screening.

In a letter from William Dunnell to Edgar Kaup (dated November 30, 1989), GeoEngineering states that "all currently existing on-site tanks contain no liquid product." Since the site is currently rented to a third party, the heating fuel source must be identified. If the fuel oil tanks are still being utilized, the integrity of these tanks must be ascertained in the next phase of the investigation.

The Amended ACO requires that polychlorinated biphenyl (PCB) contamination be fully delineated, both horizontally and vertically. Thus, additional samples must be proposed to determine the extent of PCB contamination around TP-2, TP-3, and TP-50.

12. Table 15, TPH and Finger Print Test

The units reported for the total petroleum hydrocarbon results must be consistent for all samples from the same matrix. Make the appropriate conversions on the summary tables.

In addition, the results of the finger print test are not discussed at any great length in the RI Report. This information may be pertinent to any future remedial actions selected for the site and, therefore, must be deliberated in the report.

13. Tables 25 & 26 - Summary of Metals Testing (SW & SS)

The summary tables for priority pollutant metals in surface water and sediment samples provides a row for "total metals". These figures generate no useful information and must be removed.

14. Comments Concerning Risk Assessment

As specified in Superfund Amendments and Reauthorization Act (SARA) with regards to the RI/FS Investigation, an Endangerment Assessment (EA) is performed to determine potential site related adverse effects to both human health and the environment. Guidance documents are available through EPA (Risk Assessment Guidance for Superfund, Human Health Evaluation Manual Part A Guidance for Superfund, Human Health Evaluation Manual Part A #540-1-89/002, and Risk Assessment Guidance for Superfund, Volume II Environmental Evaluation Manual #540-1-89/001).

Usually contained within the RA is a discussion of the following points for both no action and future use scenarios: indicator chemicals, exposure pathways, calculation of dose, comparison to ARARs, risk characterization, uncertainty, and ecological risk. Most of these points are not found in the RA submitted.

Within the EPA guidance documents is the suggestion to hold what is called a scoping meeting. The purpose of this meeting is to determine such parameters as appropriate indicator compounds, exposure pathways, and what types of assumptions are used to calculated dose.

15. Geological Study

Discussion

a. Soil Gas Survey

Petrex conducted a soil gas survey at the site to predict areas contaminated with volatile organic compounds (VOCs). Based on measuring the relative ion abundance of emissions from volatile compounds, in this case benzene, toluene, ethylbenzene and xylene (BTEX), several anomalies are indicated (Fig. 1). Of special

importance is the correlation between elevated ion abundance measurements detected in the vicinity of the tank farm and elevated concentrations of VOCs detected in soil and ground-water samples collected in this area. Conversely, similar elevated ion counts are reported in the vicinity of MW-17s and TP-4 but soil and ground-water samples collected from these locations report non-detect for BTEX.

b. Soils

Analyses of shallow (0 - 6 inches) and deep (6 inches above the water table) soil samples indicate that widespread soil contamination exists throughout the site. Percent levels of base neutral (B/N) compounds (30,000,000 ppb at TP-46), primarily bis (2-ethylhexyl)phthalate, are reported for samples collected in and around the tank farm area, the area proximate to tanks E-5 and E-8 in Area III, and in the former starch drying bed area (Fig. 2).

VOCs, primarily ethylbenzene and xylene, are reported site wide for shallow and deep soils with highest concentrations for the site located proximate to the tank farm area. Percent levels are reported for soil samples collected six inches above the water table at the TP-21 and TP-67 locations.

Polychlorinated biphenyl (PCB) contamination, specifically Aroclor 1254, is reported at levels exceeding the NJDEP Soil Action Level of 1 - 5 ppm for soil samples collected at the TP-2,3,9 and TP-50 locations.

c. Ground Water

Ground-water contamination is reported to be limited to the shallow zone (the shallow well screens are ten feet long and are designed to extend two feet above the water table) plus the ground water sample collected from the intermediate depth well (approximately 40 feet) at the NW-11 location. Contamination at intermediate and deep depths of the aquifer must be reported.

Elevated concentrations of VOC's, primarily ethylbenzene and xylene, are reported for samples collected from the shallow wells proximate to and downgradient of the tank farm area (MW-3 - 77,000 ppb) and for the sample collected from MW-1 (39,187 ppb). Methylene chloride, a highly soluble and mobile compound, is reported at elevated concentrations site wide. A total VOC concentration of 48 ppb is reported for a sample collected from the offsite well located on the Air Products property.

Elevated levels of B/N compounds, primarily bis (2-ethylhexyl)phthalate, are reported for on-site wells (MW-1,

3, 11, 12, and 8) and the shallow offsite well at the MW-14 location.

d. Hydrogeology

Lateral ground-water flow in the shallow, intermediate and deep portions of the aquifer underlying the site is reported to be in an east-northeast direction across the site. A lateral hydraulic gradient of 0.003 is reported with ground-water flowing in the direction of the Air Products property and Wharton Enterprises property. Discharge into the drainage ditch separating the two properties is evidenced by sheens in the ditch. It is probable that local ground-water flow is preferential along the bedding of the abandoned sewer line and drainage ditch.

Slug tests conducted on many of on-site wells provided data to calculate horizontal hydraulic conductivity of the material underlying the site. An average value of .01 cm/sec is reported for the site.

e. Conclusions

1. Based on the elevation of the standing water in the ditch and the elevation of the water table, it is likely that the shallow ground water periodically discharges into the ditch.
2. The absence of free product and/or dissolved contaminants in portions of the site is likely due to the position of the well screens relative to the water table. Well construction specifications and ground-water elevations indicate that many shallow wells do not intercept the water table. Well screens in shallow monitor wells 4, 5, 13, 14, 15, 16, and 17 were equal to or below the water table (9/89 data). None of the ground-water samples collected from these wells showed elevated levels of VOCs. With the possible exception of MW-5, one would expect contaminants to exist at the above mentioned locations based on their proximity to the sources.

A direct correlation seems apparent between non-detect VOC analyses and screens located below the water table in the monitor wells noted above.

f. Comments Concerning Geological Studies

- 1) Soil Gas results indicate potential sources in Area II near MW-1 and MW-17S but soil and ground-water samples in the area report non-detect. It is likely that free product went undetected due to well screens being below the water table. Water levels in MW-15 and MW-17S must be closely monitored

so that subsequent sampling will be conducted when static water levels drop below the top of the well screens.

- 2) In addition to additional sampling of stream water and sediments, the Department requires that sampling of stream and sediment at several locations in the ditch. Sampling locations should include the area of the outfall near the former starch drying beds and a minimum of two points down stream from the S-5 location previously sampled.
- 3) Three additional soil samples (shallow and deep) should be collected directly in front of the abandoned sewer line and along its side to determine if ground water and contaminant plume is flowing preferentially along the bedding of the pipe.
- 4) It is imperative that any future sampling of shallow ground-water monitor wells be conducted at such a time when the water table is below the top of the screened interval. Sampling for compounds with specific gravities less than water (floaters), such as ethylbenzene and xylene, with the top of the screen below the water table, may result in the plume going undetected.
- 5) The report indicates that site wide ground water contamination exists. Free product removal should be accelerated. Water table depression should be considered to accomplish this.
- 6) A Cleanup Plan/Feasibility Study to remediate soil and ground water pollution should be submitted as soon as possible. Sufficient information is currently available to proceed with these efforts.
7. Floating Product: The nature and extent of chemicals floating on top of the water table have not been adequately addressed in the Remedial Investigation Report. No map is presented to show the extent and thickness of the floating product, although such maps have been prepared for the quarterly progress reports. Such a map should be presented.

The composition of the floating product has not been clearly defined in the RI. Page 36 of the RI states that TPH fingerprinting analysis of the sample of floating product taken from monitor well 11-s showed it to be a mixture of gasoline and lubricating oil. The lab report for the TPH analysis must be included in the RI report. Also, the report should clarify whether the product been analyzed for target compound list substances of priority pollutants other than hydrocarbons.

The progress reports that have been submitted to NJDEP refer to the product xylene. This is confusing since xylene is only a minor component of gasoline and fuel oils. Clarify whether there are more than one type of floating product at the site or the chemicals that make up the layer of floating product are clearly known.

- 8) The Remedial Investigation Report must have maps that show where the site is located in the State of New Jersey or in the municipality of Wharton. This topographic, geographic and demographic information is required to evaluate the RI and to assess adequately how surface topography may have controlled the introduction of contaminants to the subsurface or to surface waters. In addition to an accurate topographic map, a map should be provided showing the relative location of the site to the Wharton municipal water supply wells, located 2600 feet from the site, as well as nearby residential areas. Such information is essential in selecting an appropriate remedy and/or the degree of monitoring that will be required to adequately protect residents in the vicinity of the site.
- 9) More information should be presented about the likely sources of the ground water contamination. This information is an essential component of the RI. If source areas such as contaminated soils, leaking storage tanks, etc., are not identified, contaminants will continue to migrate into the ground water system. The RI must identify these potential source areas and provide the data necessary to determine if remediation of these areas is needed in order to prevent additional ground water contamination.

For example, the source of the floating product and ground water contamination of Monitor Well No. 1 must be identified. Considering that shallow ground water flows east, the source of the ground water contamination detected at Monitor Well No. 1 should be located in the direction of Building 2, Building 16 or the railroad right of way. The RI should attempt to identify how such large quantities of xylene and ethylbenzene were introduced into the ground water system. The RI should indicate what chemicals were stored in the various tanks on-site, whether they were tested for leaks and if so, state the results. State whether the storage tanks are empty or do they contain chemical products? The last column of Table 1 of the RI must clearly indicate whether these tanks have been removed from site or whether they are no longer being used to store chemicals.

All available information should be utilized to develop a comprehensive interpretation of contaminant source areas and the extent of contaminant migration. The following field observations should be considered in developing such an interpretation: a sheen on water at test pits 25 and 26; floating product on water at test pits 16, 30, 37; drum found at test pit 72; rusted, broken drum found at TP-4; subsurface lime green staining at TP-75; green powdery substance and rusted drum at TP-5.

10. The nature and extent of the former impoundment area has not been adequately defined. The RI should define the boundaries of this lagoon. Test pit and soil sampling results should be used to document whether or not the soil in this area requires remediation. Records should be reviewed to determine whether the impoundment area had overflow pipes to the river.
11. A summary of sampling and QA problems should be provided in the text. It is stated in the appendices that a number of volatile organic samples exceeded their holding times. However, the sample numbers are not provided. It should be stated in the text which samples were possibly effected by the exceeded holding times and therefore may have yielded lower than true volatile organic levels. The tables of sample analyses should indicate which analyses exceeded holding times.

The list of References should also list the many relevant documents which specifically address the L.E. Carpenter Site.

16. Specific Comments

- a. page 52, third paragraph:

The last sentence must be removed or amended. Elevated levels of B/N compounds are reported for the samples collected at the S-3 (river sample) and S-5 (ditch sample).

- b. page 55, second paragraph:

~~Bis~~ (2-ethylhexyl)phthalate is (relatively) soluble in water as is evidenced by elevated levels detected in ground-water samples from monitor wells throughout the site (1100 ppb in MW-8). Therefore, ground water is a significant migration pathway for the transport of bis (2-ethylhexyl)phthalate. This paragraph must be amended to reflect this fact.

- c. page 55, fifth paragraph:

The sentence, "There is currently no indication that phthalates have moved off-site", must be removed. The subject document reports a concentration of 120 ppb bis (2-ethylhexyl)phthalate for the sample collected from off-site well MW-14S. Additionally, page 66 of the subject document reports offsite contamination at SS-3 and SS-5 locations.

- d. page 59, second paragraph:

The solubility of ethylbenzene in water is 152 mg/l. Reference to this being "almost insoluble" must be removed.

- e. page 61, third paragraph:

The solubility of xylene in water is 180 mg/l. Reference to xylene as being "virtually insoluble" must be removed. Compounds such as benzo-a-pyrene, having a solubility of 0.0038 mg/l, are considered virtually insoluble.

- f. page 62, second paragraph:

The highest concentrations of VOCs for the site are reported for ground-water samples collected at MW-3. MW-3 is located within 10 feet of the property line between L.E. Carpenter and Wharton Enterprises. Lateral ground-water flow is reported to be in a north-northeast direction across the site putting Wharton Enterprise directly downgradient of documented pollution sources. Unless an impermeable subsurface barrier or some type of "no flow" boundary exists between the properties, it is likely that migration of site related contaminants, via ground water, has, can, and will continue to migrate off-site onto adjacent properties.

The Department believes that the absence of VOCs in ground-water samples collected from many of the monitor wells, including MW-14S, is due to the well intake screen being below the static water level. This possibility must be investigated.

- g. page 62, second paragraph and pg. 64 third paragraph:

B/N contamination in ground water is reported for samples collected from MW-12S and is not limited to the area near MW-3. The extent of B/N areal contamination must be defined.

h. figure 20:

While this figure shows that high concentrations are centered around MW-1 and MW-3, it is misleading and inaccurately describes the actual plume geometry. This figure must be revised or removed from the report.

1. Page 16, last paragraph: It is stated that where floating product was suspected a large diameter casing was installed below the water table and the floating product then flushed from within the casing prior to drilling deeper. At which wells was this procedure carried out and at which wells was floating product indeed encountered? This information should be clearly presented in the RI.
- j. Page 21, Aquifer Testing: The statement that the monitor wells cannot be used as efficient observation points due to their locations and depths is questionable. There is no apparent reason why these monitor wells could not be used. Also the statement that a pumping test could not be conducted because a large diameter well was needed may not be true. The four inch diameter wells would probably be sufficient to conduct a low yield pumping test if one was determined to be necessary.
- k. Page 43, Air Sampling: The levels of benzene that were detected at the site during the summer months (Appendix F) must be indicated. Also indicate whether OSHA standards for benzene were exceeded.
1. Page 45, Geologic Cross Sections: The two cross sections must be carefully constructed. There are numerous inconsistencies between cross sections A and B concerning the depths of wells that are shown on both cross sections, the depths to various geologic units and the figures that show the construction details of the wells. A few examples of the discrepancies are cited to illustrate the need to revise these cross sections:
 - 1) The bottom of MW-17d on Cross Section "A" is at an elevation of 565 feet above msl. However, Figure 9 indicates that its bottom elevation is 584 feet above msl. Furthermore, the well log description provided in the appendices does not indicate that this well penetrated three distinct geologic units as shown. Only two geologic units are identified on the well log for this well. These cross sections must honor the data on which they are based upon.

- 2) The projection of MW-11d over 350 feet to the line of cross section "A-A" is not an acceptable method of cross section construction as it presents a misleading concept of subsurface conditions (i.e., bedrock topography).
- 3) MW-1 is shown as penetrating the unconsolidated sand and gravel unit with a total depth of approximately 592 feet on Cross Section "A". However, on Cross Section "B", MW-1 is not shown to be penetrating the sand and gravel unit and is not as deep.
- 4) The depth at which MW-11d is shown to encounter bedrock is different on Cross Sections "A" and "B".

It is not clear why it was decided not to draw the cross section lines from well to well, in segments, so that the cross sections would reflect the known subsurface conditions for particular locations. The method of projecting well information across large distances to the line of cross section produces an unreliable cross section.

- m. Page 45, General Geology: This section must reference appropriate USGS, State of New Jersey or other geologic investigations, local or regional, that relate to the subsurface conditions of this site. The major stratigraphic formations or recognized hydrogeologic units at the site must be identified.
- n. Page 46, Bedrock Morphology: Three bedrock wells are insufficient to be able to describe the bedrock morphology as resembling "a trough like valley . . . that trends east southeast. If this statement is based on other information, or other regional geologic studies or interpretations, then the source(s) of this information should be referenced. If no such information is available, then the "trough like valley" theory should be presented for what it is, a theory, and not fact.
- o. Page 46, Type of Bedrock: The description of bedrock should be more complete: e.g., pink, tan and gray, medium to coarse grained granite with frequent oxidized, near horizontal to vertical fractures.
- p. page 46, last paragraph: The RI Report should indicate how the water levels were measured and where the data is presented.

End of Comments

EGK:cn

3/2/90



Ion Counts

≥ 200,000

20,000-199,999

* Positive identification of compounds not possible due to terpene interference.

GEO ENGINEERING, INC.
New Jersey

L. E. Carpenter and Co. Silt
New Jersey
Wharton.

Relative Flux

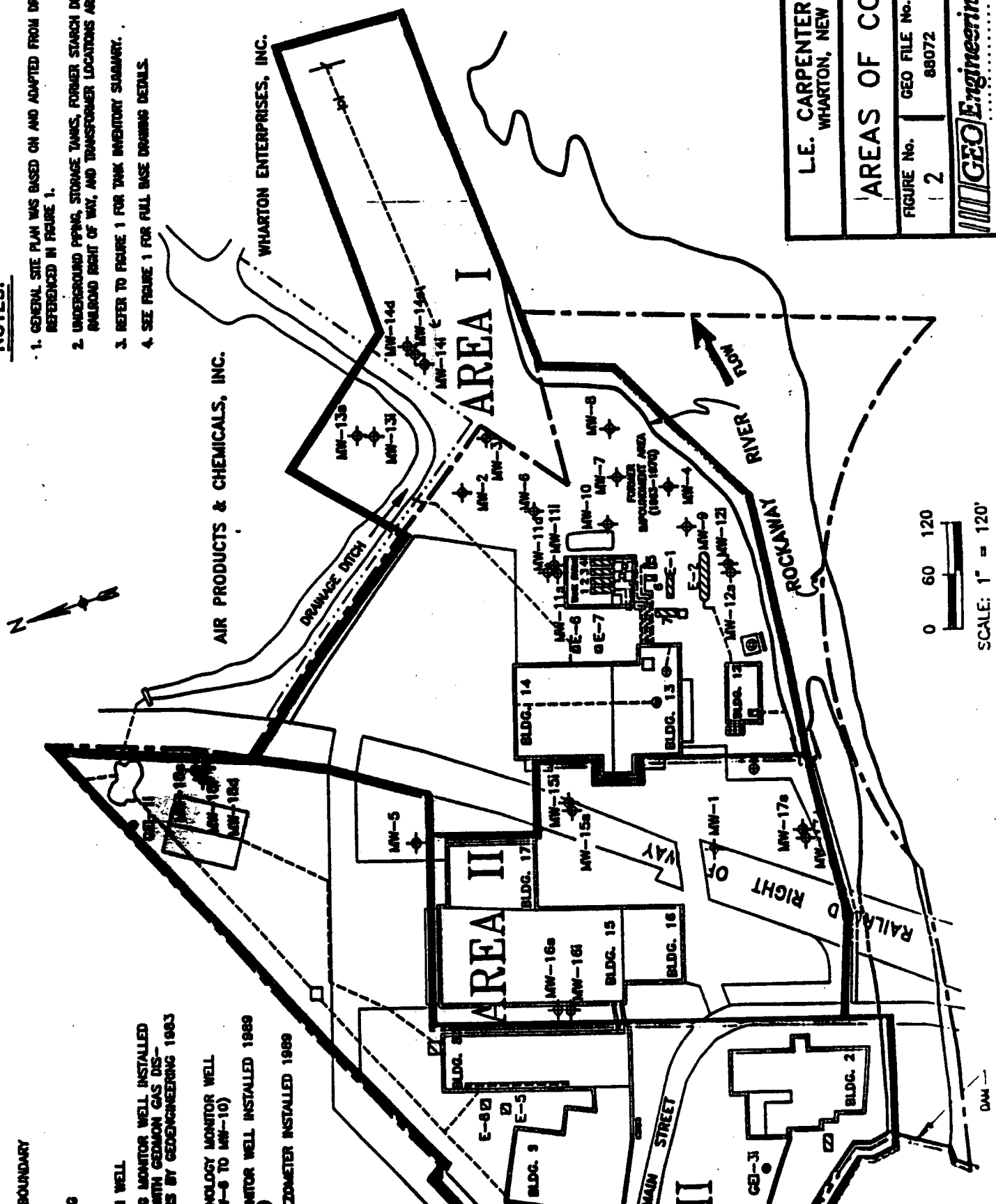
Toluene, Xylene, Ethyl Benzene (TXEB)

Scale: 1" = 100'

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NOTES:

1. GENERAL SITE PLAN WAS BASED ON AND ADAPTED FROM DRAWINGS REFERENCED IN FIGURE 1.
2. UNDERGROUND PIPING, STORAGE TANKS, FORMER STARCH DRYING BEDS, RAILROAD RIGHT OF WAY, AND TRANSFORMER LOCATIONS ARE APPROXIMATE.
3. REFER TO FIGURE 1 FOR TANK INVENTORY SUMMARY.
4. SEE FIGURE 1 FOR FULL BASE DRAWING DETAILS.



BOUNDARY

1 WELL

3 MONITOR WELL INSTALLED WITH GEDMON GAS DIS- BY GEENGINEERING 1983

NOLOGY MONITOR WELL 1-6 TO MW-10)

MONITOR WELL INSTALLED 1989

ZOMETER INSTALLED 1989

L.E. CARPENTER AND CO.
WHARTON, NEW JERSEY

AREAS OF CONCERN

| FIGURE No. | GEO FILE No. | DATE | REV. |
|------------|--------------|---------------|------|
| 2 | 88072 | NOVEMBER 1989 | Ø |

GEOEngineering

DOVER, N.J.
(201) 381-3600

TABLE I

HAZARDOUS SITE SCIENCE ELEMENT NJDEP SOIL ACTION LEVELS

| | |
|--|---------------|
| Total Petroleum Hydrocarbons (TPHC) | 100 ppm |
| Surrogate Levels: | |
| Acid Extractables (AE) | Case-by-Case |
| Base Neutrals (BN) | 10 ppm |
| Volatile Organics (VOC) | 1 ppm |
| Pesticides | |
| DDT | 1-10 ppm |
| Chlordane | 1 ppm |
| Other | Case-by-Case |
| Polychlorinated Biphenyls (PCB) | 1-5 ppm |
| Priority Pollutant Metals (PPM): | |
| Antimony | 10 ppm |
| Arsenic | 20 ppm |
| Barium | 400 ppm |
| Beryllium | 1 ppm |
| Cadmium | 3 ppm |
| Chromium | 100 ppm |
| Copper | 170 ppm |
| Lead | 250-1,000 ppm |
| Nickel | 100 ppm |
| Mercury | 1ppm |
| Molybdenum | 1ppm |
| Selenium | 4ppm |
| Silver | 5 ppm |
| Thallium | 5 ppm |
| Vanadium | 100 ppm |
| Zinc | 350 ppm |
| Polycyclic Aromatic Hydrocarbons (PAH) | |

ppm = Part per million (mg/kg)

The action levels are reference number used to identify presence of contamination. All contamination identified at a site above the action level should have horizontal and vertical extent delineated. Specific cleanup objectives are developed on a case-by-case basis (and may be the action levels in some instances).

Based on the information provided for groundwater, the following corrective action criteria have been developed for the L.E. Carpenter Site, Wharton Borough.

| Compound | Concentration (ug/l) |
|---------------------------|----------------------|
| ethyl benzene | * |
| total xylenes | 44 |
| toluene | * |
| methylene chloride | 2 |
| carbon tetrachloride | 2 |
| 1,2-dichloroethane | 2 |
| trichloroethylene | 1 |
| 1,1,2,2-tetrachloroethane | 1.4 |
| chlorobenzene | 4 |
| lead | 50 |
| arsenic | 50 |
| nickel | 2.1 mg/l |
| copper | 1.0 mg/l |
| zinc | 5.0 mg/l |

* Combined total shall not exceed 50 ug/l

Corrective action criteria were also requested for styrene and antimony. These compounds will be forwarded to the Division of Science and Research in order to develop the appropriate ground water quality standard.